

## NOTES ON THYSANOPTERA FROM BRITISH COLUMBIA.

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The following notes are submitted herewith to augment our knowledge of Western Thysanoptera, a group which appears to have been sadly neglected by Canadian entomologists.

**Orothrips kelloggii yosemitii** Moulton. (Plate XV, Figs. 1-3.)

A single female of this variety was taken on Mt. McLean at Lillooet, B.C., at an altitude of about 6,000 feet, off *Amelanchier*, on July 25, 1917. I have been unable to compare this single female with specimens of *kelloggii* or of its variety *yosemitii*. From the description, however, given by Moulton (1), the shape of the sense areas on antennal segments 3 and 4, together with the relative lengths and colours of the antennal joints, clearly place the specimen from Lillooet as belonging to the variety *yosemitii*. There are, however, certain structural features in the specimen before me which differ from the short description given by Moulton.

*Antennæ*.—The measurements of the antennal segments compare with the description with the exception of segment 4, which compares with segment 3 in length as 74 to 99 $\mu$ , instead of as 96 to 99 $\mu$ . The constriction in segment 3 is not very apparent, and the base of segment 3 is white or at least lighter in colour than the apical portion of segment 2, which is yellow. Sense areas are present on the apical portions of segments 3, 4, 5 and 6; those on segments 3 and 4 ovoid; those on segments 5 and 6 circular, with a simple transparent sense-cone protruding from each. There also appear to be two ovoid sense areas, beside each other, on segment 3, and the same on segment 4.

*Mouth Cone*.—Maxillary palpi 7-segmented, the basal joint large and as long as the remaining six segments; labial palpi 4-segmented.(2)\*

*Colour*.—The colour is brown; head and prothorax darker than the remainder of the body, which is shaded with orange.

It may be seen, therefore, that despite the small variations noted, the species from Lillooet belongs to the variety *yosemitii*. Being so, it is interesting, as this record greatly extends the distribution of this insect, which so far has only been recorded from the Yosemite Valley, California.

**Æolothrips fasciatus** Linn. (Plate XV, fig. 4.)

I find in my collection two male specimens of this species; one taken off *Lithospermum pilosum* from Kelowna, B.C., on May 16, 1917; and the other off the bloom of the cultivated dahlia from Agassiz, B.C., on July 14, 1914. The latter specimen was taken in association with females of the same species and with many adults of *Frankliniella tritici*. In the literature at my disposal I have been unable to find any reference to males of *Æ. fasciatus*. For that reason I submit herewith the following description with the respective measurements of the two specimens before me.

*Æ. fasciatus*, 2 males (A and B).

Head, length .14 mm. and .14 mm., width .17 mm. and .18 mm.; prothorax, length .15 mm. and .15 mm., width across centre .18 mm. and .20 mm.; meso-

\*Moulton (2) gives labial palpi 4-segmented in the key, but on pp. 45-46 gives 5-segmented in the description of the genus and species.

and metathorax length over dorsal plates .26 mm. and .22 mm., width across metathorax .28 mm. and .26 mm.; abdomen, length .84 mm. and .82 mm., width across male appendage on 9th segment .21 mm. and .21 mm.; total length of body 1.39 mm. and 1.33 mm.; antennal length .46 mm. and .37 mm.; length of segments:

	1	2	3	4	5	6-9
A.....	35	52	113	105	87	70
B.....	32	43	78	87	70	61

Colpur, uniformly light brown, first few abdominal segments slightly lighter in colour, though blending with remainder of body; male appendage of same colour as the head, intersegmental and body pigment carmine. Antennal joint 1, concolorous with head; 2 brown shading to light brown at tip; 3 light brown at base, brown in upper half with a circle of darker brown at tip; remaining segments 4-9 brown. Legs brown concolorous with head with the exception of upper half of fore-tibiae and fore-tarsi, which are light brown. Fore-wings banded with two brown between three white areas.

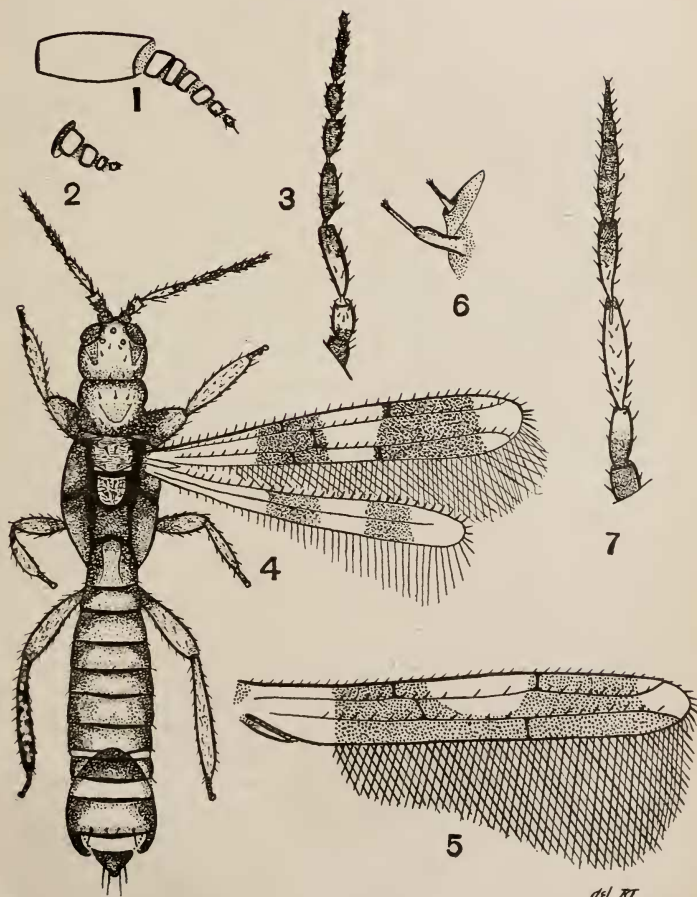
*Females* have been taken on a variety of plants of which may be mentioned *Elymus condensatus*, clover, *cratagus*, cherry, *Prunus demissa* and *Amelanchier* at various times during May, June and July 1914-1918 at Victoria, Lillooet, Agassiz, Vernon and Kelowna. The distribution of this species in the Province of British Columbia must, therefore, be widespread, inasmuch as it has been taken in localities varying from the humid to the arid. During the summer of 1918 females of this species were observed to be in association with the Onion Thrips (*T. tabaci*), upon which it is doubtless predacious, on onion foliage at Kelowna, B.C. Williams (3) records this species as predacious on the pea thrips (*Kakothrips pisivora* West) in Europe, but also notes that it feeds on pollen and plant juices (4).

#### ***Æolothrips annectans* Hood (5).**

(Plates XV, fig. 5, and Plate XVI, fig. 1.)

This species apparently occurs commonly in British Columbia. It has been taken on several occasions during May, June and July in the past three years at points in the Okanagan Valley, and in the vicinity of Victoria on Vancouver Island. It has been taken also on a variety of plants, among which may be mentioned, *Acer glabrum*, *Ribes viscosissimum*, *Sambucus racemosa*, *Ilex europæus*, apple, alder, *Lithospermum pilosum*, *Amelanchier florida*, and in sweeping through general vegetation. Possibly the most notable record of its presence in numbers was observed in Kelowna, B.C., during early July (1918) in commercial onion plantations, where many specimens were seen associated with and doubtless predacious upon the onion thrips (*T. tabaci*). Mr. J. D. Hood, to whom some British Columbia specimens were submitted, agreed that my "determination was correct, though a remarkable addition to its known distribution," (April, 1918). According to my information this species thus far has only been recorded from Maryland, Virginia and New York State, U. S. A. (6).

Eleven specimens before me clearly agree with the account given by Hood (5). The presence of slight transverse striations across the occiput constitutes



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the only main difference from the published description. The fore-wings are shaded as described, but in addition have their extreme basal portions, (scale and fore-wing), shaded brown-gray. The measurements of the British Columbia specimens may be briefly given as follows:

Head, length .15 mm., width across occiput .19 mm.; prothorax, length .15 mm., width at centre .22 mm.; total length of body, 1.7 mm.-1.8 mm.; fore-wing, length .94 mm.-1.01 mm.; antennæ, length .40 mm.-.42 mm.; antennal segments, length:

Segment.....	1	2	3	4	5	6-9
Length.....	30	52	105-122	87-96	70	52

In addition, the following notes are added to the description already given by Hood:

*Fore-wings*.—Cross-veins present; two cross-veins connecting anterior ring vein to first longitudinal vein, one connecting the two longitudinal veins, one and (apparently) sometimes two connecting second longitudinal vein to posterior margin of wing; spines on anterior margin of ring vein 37-41, on first or anterior longitudinal vein 13-16 (arranged 6-8 brown, 2-3 white, 4-6 brown), on second or posterior longitudinal vein 19-21 (arranged 1 white, 18-20 brown); on scale 5-6 on anterior margin and one central. The two wings of the same specimen often vary in the matter of alar spines.

*Maxillary palpi*.—3-segmented, geniculate, basal joint twice as broad and nearly twice as long as the middle joint, apical small; labial palpi 4-segmented, basal joint as long as the remainder.

***Æolothrips auricestus*, new species.**

(Plate XV, figs. 6, 7, and plate XVI, fig. 2.)

I am indebted to Mr. J. D. Hood, of the United States Biological Survey, for confirming my belief, that this species has not been previously described.

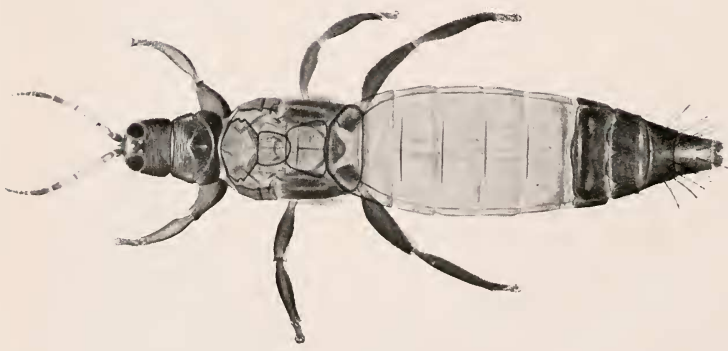
*Measurements*.—Head, length .18 mm., width across occiput .21 mm.; prothorax, length .18 mm., width .22 mm.; mesothorax, length .24 mm., width .35 mm.; abdomen, length 1.48 mm. Total length of body about 2.08 mm.; antennæ, total length .44 mm.; antennal lengths:

Segment.....	1	2	3	4	5	6-9
Length.....	35	61	113-122	87-91	70	70

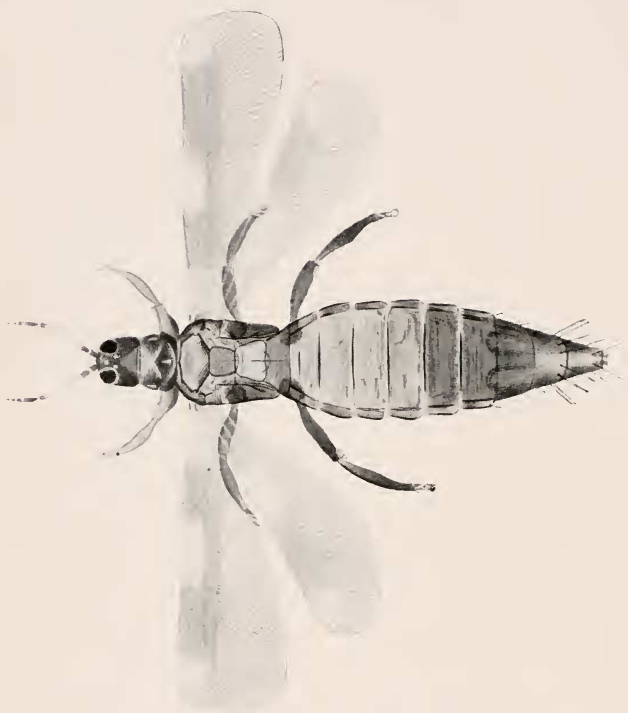
*Colour*.—Brown; head slightly darker brown than other parts of the body; antennal segment 1, brown; 2, brown at base (at times light brown at base) shading to white at tip; 3, creamy-white with a circle of brown at tip; 4, pale-brown at base shading to brown at tip; remaining segments similar to segment 1. Legs brown, fore-legs lighter; fore-tibiæ and tarsi light-brown; abdomen segments 2-6 golden-yellow, last four segments brown, segment 1 light brown shading to yellow on posterior half. Fore-wings banded, with two brown areas between three clear white ones, each area of about equal width. Hind wings banded, similar to the fore-wings, but the bands of brown are pale and indistinct. Scale shaded brown at base.

*Head*.—Slightly wider than long, about equal in length to the prothorax, slight transverse striations across occiput, covered with numerous small spines;





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eyes large, on ventral surface extending rather more than half way the length of the head, coarsely faceted and sparsely pilose; ocelli three, conspicuous, the posterior pair contiguous with the inner margins of the eyes; mouth-cone reaching into the posterior third of the prothorax; maxillary palpi 3-segmented, geniculate, basal joint twice as broad and nearly equal in length to the middle joint, apical small; labial palpi 4-segmented, three apical joints slightly longer than basal joint; antennæ 9-segmented, about two and one-half times as long as the head, all segments clothed with numerous short spines, those on segments 1 and 2 fewer and stouter, spines on all segments about equal in colour to the segments upon which they are placed; sense areas on apical portions of segments 3, 4 and 5, being respectively elongated and inconspicuous, elongated and conspicuous, oval and conspicuous.

*Prothorax*.—Slightly wider than long, about equal in width and length to the head, emarginate midway on each lateral margin, the dorsal surface clothed with numerous stout spines. *Mesothorax* wider than prothorax, mesoscutum striate-reticulate, with eight prominent spines. *Metathorax* narrower than mesothorax, metascutum reticulate, with four spines on dorsal surface. *Legs*, front femora thickened, slightly lighter in colour to femora of middle and hind legs, all tibiæ armed at apex, those spines on hind tibiæ much the strongest, hind tibiæ with 8-10 stout spines on inner margin, each fore-tarsus armed with a stout hook, which is yellow, and a tooth, which is shaded brown. *Fore-wings* reaching to about the eighth abdominal segment, rounded at tip, cross-veins present, no cross-vein apparent connecting the second longitudinal vein with the posterior ring vein, five to eight minute spines on each brown area on the anterior longitudinal vein, and six to eight on each brown area on the posterior longitudinal vein, right wing often varying from the left wing in the matter of alar spines, all spines equal in colour to the portion of wing upon which they are placed; scale with one central spine and six to eight inconspicuous spines on anterior margin. *Hind wings* with a short spine-like fringe on anterior margin reaching from basal fourth to tip, simple fringe along the posterior margin. *Abdomen* elongate-ovate, conspicuous spines only on the ultimate and penultimate segments.

Described from 9 macropterous females, taken by the author from the Western Wild Rye grass, *Elymus condensatus*, at Vernon and Kelowna, British Columbia, in July, 1917. Brachypterous forms also occur in association with the macropterous forms. Their body characters agree with the above account.

The type and cotype have been placed in the collection of the National Collection of Insects, Department of Agriculture, Ottawa, Canada. Paratypes are also retained in the collection of the author.

### **Taeniothrips inconsequens** Uzel. (The Pear Thrips.) Plate XVII.

During the course of a two-year's study (1916, 1917) of the pear thrips, *Taeniothrips (pyri)* Dan *inconsequens* Uzel, on the Pacific coast of British Columbia, a number of variable points in the external anatomy became apparent following the close examination of a large number of specimens. Early in the study it was apparent that the spines upon the wing, both as regards numbers and position, represented too variable a character alone to certify its specific identity. This observation led to a close examination of the essential specific

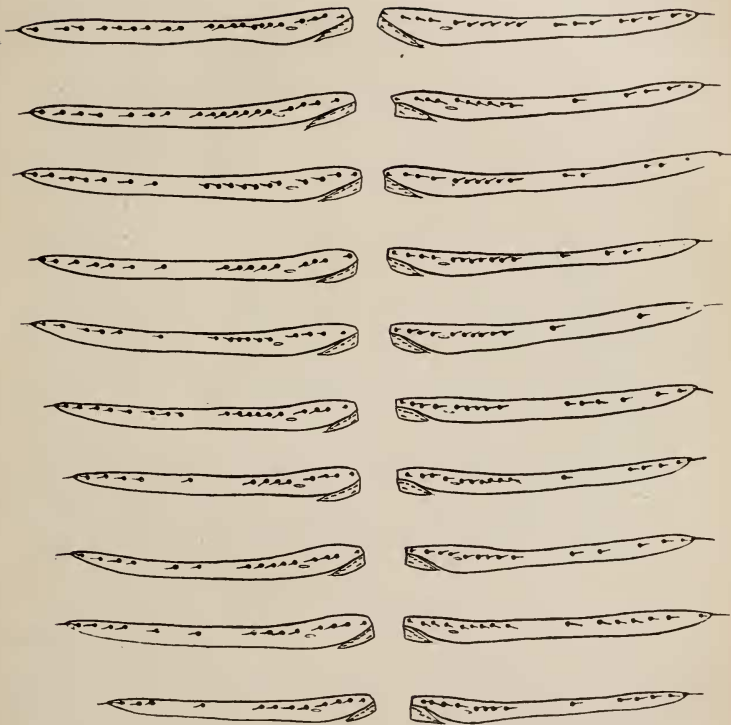
characters of the species, and the results of this study are recorded herewith, supplementing the description already given by Moulton (2).

*Head*.—Width across the occiput .15 mm., across the eyes .13 mm.; length 3. mm.; slightly wider than long; cheeks arched; occiput transversely striate, bearing eight minute spines immediately posterior to the compound eyes; a pair of very prominent spines between the posterior ocelli, situated within the margins of the pigmented ocellar crescents; a single minute spine, on each side, near the margin of the compound eyes, in a lateral direction from the anterior ocellus; vertex smooth; compound eyes, prominent, oval in outline black with light borders, coarsely faceted and slightly pilose; ocelli approximate yellow, margined inwardly with orange-brown crescents, posterior ones approximate to but not contiguous with the light inner borders of the eyes. Mouth-cone pointed, tipped with black, maxillary palpi three-segmented, each segment about equal in length, the second shortest and the third longest; labial palpi two-segmented, basal segment very short. Antennæ eight-segmented, about two and one-half times the length of head (.32 mm.); spines on all segments pale; a forked sense area on dorsal surface of segment 3, with a similar area on ventral surface of segment 4, with a pair of moderately stout spines immediately beneath each area; whorls of minute inconspicuous hairs on posterior portions of segments 3 to 6. Antennal lengths, segment 1,  $33\mu$  to  $36\mu$ ; 2,  $42\mu$  to  $47\mu$ ; 3,  $63\mu$  to  $64\mu$ ; 4,  $54\mu$  to  $64\mu$ ; 5,  $33\mu$  to  $42\mu$ ; 6,  $57\mu$  to  $66\mu$ ; 7,  $9\mu$  to  $10\mu$ ; 8,  $12\mu$  to  $13\mu$ . Total length .30 mm. to .34 mm.

The head characters, thus given, are apparently stable, and represent the typical formation. Three prominent spines of equal and normal length may, however, at times, be found between the posterior ocelli. Variations in the antennæ are frequently met with, but these may be classed as distinct deformities. They often take the form of a reduction in the number of segments from eight to seven or six, either by the fusion of two segments or by the complete elimination of certain segments.

*Prothorax*, length .13 mm.; breadth .2 to .25 mm.; as long as head, but wider; dorsal surface smooth; sides slightly arched; a weak spine anteriorly-directed on the anterior angles; a pair of large, strong spines on the posterior angles; from twenty-eight to thirty-six spines scattered over the dorsal surface, all small and inconspicuous, except a central moderately stout pair on the posterior margin and a single one, of equal strength, on each side, situated immediately cephalad of the stout pair in the posterior angles. *Mesothorax*, sides evenly convex, angles rounded; scutum (mesonotal plate) striate. *Metathorax*, scutum and scutellum (metanotal plates) faintly striate; four spines along anterior margin of scutum, the inner two the largest. *Legs* moderately long; spines on tip of fore and middle tibiae weak; hind tibiae furnished with a row of seven to nine strong, light-brown spines and a pair of stout spines borne at the tip of each tibia; tarsus furnished with one comparatively stout light-brown spine near the base, and a few pale ones. *Wings* present, extending slightly beyond the tip of abdomen, about twelve times as long (1 mm.) as wide; pointed at tips; colour very slightly tinted light-brown; costal vein thickly set with from twenty-three to thirty-three long spines; costal fringe twice as long as costal spines; fore-vein with twelve to twenty-two spines arranged in groups. On the basal half of wing, on the fore-vein, a single small spine, followed by a





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group of three spines, followed by a variable group of not less than four and as many as eight spines; on the distal half of wing the spines of the fore-vein are exceedingly variable, both as regards numbers and disposition; hind-vein with twelve to eighteen regularly placed spines; scale five spines; interior of scale one spine.

It may be shown, also, that it is the exception, not the rule, to find the two wings of the same specimen equal as regards length of wing, or number and disposition of alar spines. Almost invariably the two wings are dissimilar in some respect. Plate XVII represents outline camera lucida sketches of the right and left wings of ten typical specimens. Rather more than half of the wings examined (59 per cent.) showed the basal portion of the fore-vein with spines "arranged in two groups of 3 to 6, respectively," whilst 28 per cent. were arranged in two groups of 3 and 5, 7 per cent. in 3 and 7, 5 per cent. in 3 and 4, and 1 per cent. in 3 and 8. These figures, indicating the differences that are liable to occur plainly, show that the wing characters are of minor value in the quick and ready examination for the determination of the species.

*Abdomen* sub-ovate; 10-segmented, tapering abruptly toward the tip from the eighth segment. Dorsal surface of segment 2 to 8 with from eight to ten spines on each segment, the most prominent being on the lateral margins; posterior margin of segment 8 with a fine comb-like structure consisting of from thirty-eight to forty-four teeth; segments 9 and 10 with about ten of the longest and most prominent spines of the body. *Total length* from tip of vertex to tip of abdomen about 1.26 mm. *Colour*, head, thorax and abdomen uniformly dark-brown with connective tissue between segments of the abdomen, the tarsi and tibiae shading from light-brown to yellow. Segment 3 of the antennae light brown.

The wings though slightly tinted with light-brown, when resting over the back, appear, to the naked eye, to be grey in comparison to the dark-brown of the abdomen. Many light coloured specimens, especially those forms which have recently emerged from the soil in the spring, may be frequently observed; this colour difference, however, may be preserved throughout the life of the adult.

### ***Thrips physapus* Linn.**

This species is common in British Columbia, under arid and humid conditions, and may be found throughout the entire season. It has been taken commonly off dandelion at Vernon and near Victoria during early April and May, as well as off *Rubus parviflorus* flowers during June in Vancouver, and recently it has been found in the blooms of partly frozen garden flowers, during December. Carpenter (7) before the Royal Dublin Society in 1900 and again in 1901, draws attention to this species as being destructive to the blossoms of the pear near Dublin, Ireland, causing a failure in the fruit crop. In British Columbia, in localities frequented by *Taeniothrips inconsequens*, *Thrips physapus* also is found to occur, often in similar positions on like plants, frequently associated in the same blossom.

### ***Thrips tabaci* Lind.**

The adults of this species are known as the "Onion thrips" in British Columbia. The species undoubtedly occurs on a wide range of plants, and is